

Appendix G

Verification of the Existing Features of a Home for Existing + Addition + Alteration Performance Approach

When adding to or altering an existing home, compliance credit can be taken for upgrading existing features by using the performance approach when the existing features are verified by a qualified HERS rater prior to registration of the certificate of compliance.

The performance approach provides for a means to trade off against features that may not meet the prescriptive requirements, such as exceeding the allowed maximum glass area, by demonstrating that the house to be built (proposed design) achieves the same level of efficiency as it would if it were built to the prescriptive requirements (standard design). The standard design is the hypothetical house that sets the target energy budget for the proposed house.

The Existing + Addition + Alteration approach gives further credit for upgrading existing features. It does this by lowering the standard design for an altered building feature down to match the existing energy efficiency of the building feature before it is altered. The greater the efficiency of the altered building feature is relative to the existing energy efficiency, the greater the compliance credit will be. Third-party verification of the features prior to the construction is required to receive this compliance credit. The credit level depends on whether defaults are used or actual values (that are less efficient than defaults) are used.

The proposed design is calculated using the actual energy efficiency values of the existing unaltered components of the existing house, as well as the proposed values of the altered components, plus the proposed features of the addition. Each building component must be modeled correctly as one of the following classifications below in order to determine the proposed design:

1. “Existing” – these building components remain unchanged by the alterations or additions (e.g., insulated exterior walls in the existing portion of the home that will not be touched).
2. “Altered” – these building components exist prior to the remodel, but are being changed (e.g., roof insulation that will be added as part of the construction work, or a furnace that is being replaced as part of the construction work).
3. “New” – these building components do not exist prior to the construction work. (e.g., new walls added to create the addition).

All of these building components will determine how the standard design is calculated. Existing features will be modeled the same in both the proposed and standard designs. New features will be modeled in the standard design according to prescriptive package A, Table 150.1-A. Altered features will be modeled in the standard design according to Table 150.2-B.

There are two columns in Table 150.2-B. One column details how the standards design is calculated for altered components when the existing features are not verified by a HERS rater. The other column details how the standards design is calculated for altered components when the existing features are verified by a HERS rater prior to construction. Without HERS verification, the standard design for existing features is calculated using the prescriptive or mandatory measures according to Table 150.2-B.

In order for the building to comply, the proposed design (proposed house) must be equal to or less than the standard design (standard house) in order to comply. The existing portions of the proposed house will be compared to the existing portions of the standard house, the efficiencies of which are determined by Table 150.2-B. When a feature in the proposed house is better than the standard house, it is referred to as a compliance credit, and it can be used to trade off against features that are less efficient than the standard house. For example, without third-party verification, attic insulation is assumed to be R-30 in the standard house. With HERS verification, attic insulation for the standard house is calculated using the existing attic insulation value, even if it is R-0. If the actual attic insulation value is substantially less than R-30, more compliance credit can be obtained by having it HERS verified.

Example:

Consider the house in Figure G-1 in climate zone 12. The shaded area is the addition. Some windows and walls were removed to build the addition, but these are ignored.

The existing home has the following features:

1. Single-pane metal framed windows
2. 2x4 R-11 walls, and R-19 attic insulation
3. AFUE 75 furnace

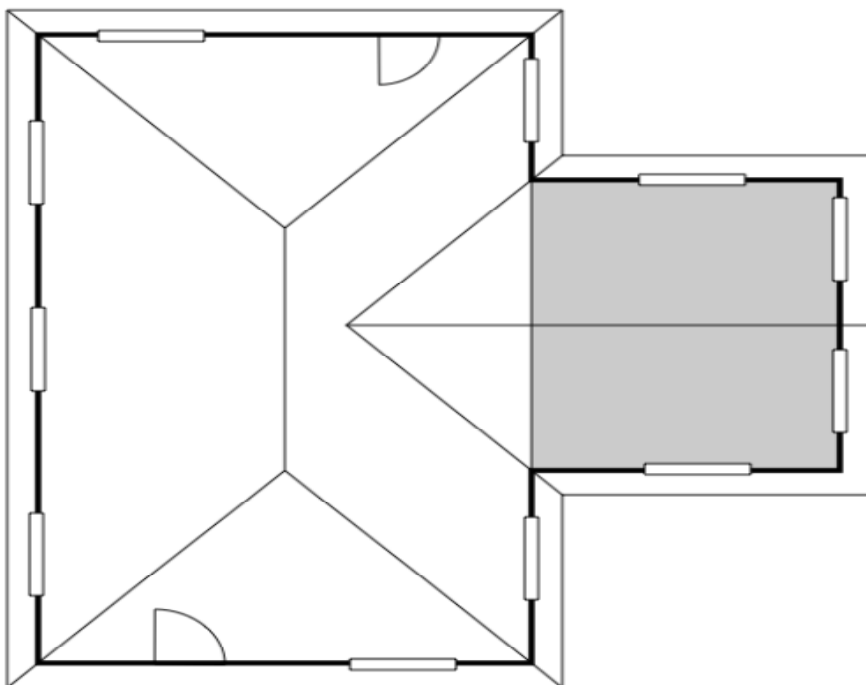


Figure G-1 – The Proposed Addition and Alterations

Component	Status	Proposed House	Standard Design w/o verification	Standard Design w/verification
Attic	Existing Altered New	R-38 R-38	R-30 R-38	R-19 R-38
Walls	Existing Altered New	R-13	R-11 R-15+4	R-11 R-15+4
Window	Existing Altered New	0.30/0.30 0.30/0.30	0.40/0.35 0.32/0.25	1.28/0.80 0.32/0.25
Furnace	Existing Altered New	0.92	0.78	0.75
Attic	Existing Altered New	R-38 R-38	R-30 R-38	R-19 R-38

Part of the construction work includes replacing all of the windows with low-E vinyl windows to match the new windows in the addition, adding R-19 to the existing attic and reroofing the entire house with cool roof shingles. The existing furnace will be replaced with a new high efficiency furnace.

For the proposed design, none of the attic is modeled as “existing” because insulation is being added to the existing part of home, and the attic in the addition is new, so the attic will be modeled as “new” for

the addition and “altered” for the existing home. Similarly, none of the roof or windows are modeled as “existing” because the all windows and the roof are being replaced on the existing home, and new ones are installed in the addition, so windows and the roof will be modeled as “new” for the addition and “altered” for the existing home. On the other hand, none of the existing walls are being altered, so they are either “existing” or “new”. The furnace, even though it is new, is modeled as “altered” because it is replacing an existing furnace. Note that the walls, windows, and other components that are removed as part of the addition and alterations are ignored and not modeled

Table G-1 illustrates how the proposed house features and the standard house features are calculated with and without HERS verification of the existing conditions. The values in **bold face** indicate where there is substantial compliance credit is gained by having HERS verification.

The HERS rater must visit the home to verify the assumptions of the existing conditions in the building, prior to registration of the certificate of compliance.

HERS raters are to follow the protocols for a Whole House Home Energy Rating (WHHER) when verifying existing conditions. The HERS rater must be trained by the providers to verify the existing conditions of the home consistent with Energy Commission approved HERS provider training for the verification requirements specified in Table 150.2-B. The Data Registry will generate a CF3R-EXC-20-H compliance document based upon the output from the Performance Compliance Software. The CF3R-EXC-20-H will list the features of the existing conditions that must be field verified by the HERS rater. A registered CF3R-EXC-20-H that agrees with the existing conditions input for the proposed building for the performance compliance calculation will be required by the HERS Registry as a prerequisite to completion of the registration of the CF1R for the project.

The Whole House Home Energy Rating protocols are established by the HERS Technical Manual (CEC-400-2008-012). Appendix A of that document details the protocols for verification of each component. Raters must follow all Energy Commission approved procedures established by the HERS provider. The HERS Technical Manual can be downloaded from:

<http://www.energy.ca.gov/2008publications/CEC-400-2008-012/CEC-400-2008-012-CMF.PDF>